

What is claimed is:

1. A peptide having an amino acid sequence of SEQ ID No:1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, or 17 in the sequence listing.

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2. A peptide having an amino acid sequence of SEQ ID No:10 in the sequence listing, comprising:

Thr-Phe-Xaa-Xbb-Xcc-Xdd-Xee-Xff-Leu-Xgg-Asp-Xhh-Xii, wherein Xaa is Asp or Glu, Xbb is Tyr or Phe, Xcc is Leu or Ile, Xdd is Arg or Gln, Xee is Ser or Ala, Xff is Val or Phe, Xgg is Glu or Asp, Xhh is Phe or Tyr, and Xii is Phe or Tyr.

- 10 3. An inducer of cytotoxic T lymphocytes, wherein the inducer comprises at least the peptide of claim 1.

- 15 4. An inducer of cytotoxic T lymphocytes, wherein the inducer comprises at least the peptide of claim 2.

5. A method for inducing cytotoxic T lymphocytes using the peptide of claim 1.

- 20 6. A method for inducing cytotoxic T lymphocytes using the peptide of claim 2.

7. A cancer vaccine comprising at least the peptide of claim 1.

8. A cancer vaccine comprising at least the peptide of claim 2.

9. A polynucleotide encoding the peptide of claim 1, or its complementary strand.
10. A polynucleotide encoding the peptide of claim 2, or its complementary strand.
- 5 11. A polynucleotide that hybridizes with the polynucleotide or its complementary strand of claim 9 under a stringent condition.
12. A polynucleotide that hybridizes with the polynucleotide or its complementary strand of claim 10 under a stringent condition.
- 10 13. A recombinant vector comprising the polynucleotide and/or its complementary strand of claim 9.
14. A recombinant vector comprising the polynucleotide and/or its complementary strand of claim 10.
- 15 16. A recombinant vector comprising the polynucleotide and/or its complementary strand of claim 11.
- 20 17. A transformant transformed with the recombinant vector of claim 13.
- 25 18. A transformant transformed with the recombinant vector of claim 14.

19. A transformant transformed with the recombinant vector of claim 15.
20. A transformant transformed with the recombinant vector of claim 16.
- 5 21. A method for producing a peptide, which comprises the step of culturing the
transformant of claim 17.
22. A method for producing a peptide, which comprises the step of culturing the
transformant of claim 18.
- 10 23. A method for producing a peptide, which comprises the step of culturing the
transformant of claim 19.
24. A method for producing a peptide, which comprises the step of culturing the
15 transformant of claim 20.
25. An antibody that immunologically recognizes the peptide of claim 1.
26. An antibody that immunologically recognizes the peptide of claim 2.
- 20 27. A method for screening a compound that interacts with the peptide of claim 1 and
enhances the recognition property by at least one of HLA-A2402-restricted cytotoxic T
lymphocytes or HLA-A2-restricted cytotoxic T lymphocytes, wherein said method
comprises contacting said peptide with said compound to determine said recognition
25 property.

28. A method for screening a compound that interacts with the peptide of claim 2 and enhances the recognition property by HLA-A2402-restricted cytotoxic T lymphocytes, wherein said method comprises contacting said peptide with said compound to determine said recognition property.

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29. A method for screening a compound that interacts with the polynucleotide of claim 9 and enhances the expression wherein said method comprises contacting said polynucleotide with said compound to determine said expression.

10 30. A method for screening a compound that interacts with the polynucleotide of claim 10 and enhances the expression wherein said method comprises contacting said polynucleotide with said compound to determine said expression.

15 31. A method for screening a compound that interacts with the polynucleotide of claim 11 and enhances the expression wherein said method comprises contacting said polynucleotide with said compound to determine said expression.

20 32. A method for screening a compound that interacts with the polynucleotide of claim 12 and enhances the expression wherein said method comprises contacting said polynucleotide with said compound to determine said expression.

33. A method for screening a compound that interacts with the recombinant vector of claim 13 and enhances the expression wherein said method comprises contacting said recombinant vector with said compound to determine said expression.

34. A method for screening a compound that interacts with the recombinant vector of claim 14 and enhances the expression wherein said method comprises contacting said recombinant vector with said compound to determine said expression.

5 35. A method for screening a compound that interacts with the recombinant vector of claim 15 and enhances the expression wherein said method comprises contacting said recombinant vector with said compound to determine said expression.

10 36. A method for screening a compound that interacts with the recombinant vector of claim 16 and enhances the expression wherein said method comprises contacting said recombinant vector with said compound to determine said expression.

15 37. A method for screening a compound that interacts with the transformant of claim 17 and enhances the expression wherein said method comprises contacting said transformant with said compound to determine said expression.

38. A method for screening a compound that interacts with the transformant of claim 18 and enhances the expression wherein said method comprises contacting said transformant with said compound to determine said expression.

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39. A method for screening a compound that interacts with the transformant of claim 19 and enhances the expression wherein said method comprises contacting said transformant with said compound to determine said expression.

40. A method for screening a compound that interacts with the transformant of claim
20 and enhances the expression wherein said method comprises contacting said
transformant with said compound to determine said expression.

5 41. A method for screening a compound that interacts with the peptide of claim 1 and
enhances the recognition property by at least one of HLA-A2402-restricted cytotoxic T
lymphocytes or HLA-A2-restricted cytotoxic T lymphocytes, wherein said method
comprises contacting the transformant, which is transformed with recombinant vector
comprising polynucleotide encoding said peptide, with said compound to determine said
10 recognition property.

42. A method for screening a compound that interacts with the peptide of claim 2 and
enhances the recognition property by HLA-A2402-restricted cytotoxic T lymphocytes,
wherein said method comprises contacting the transformant, which is transformed with
15 recombinant vector comprising polynucleotide encoding said peptide, with said compound
to determine said recognition property.

43. A compound obtained by the screening method according to claim 27.

20 44 A pharmaceutical composition comprising an effective amount for cancer
treatment of at least one selected from the peptides of claim 1.

45. A pharmaceutical composition comprising an effective amount for cancer
treatment of at least one selected from the peptides of claim 2.

46. A pharmaceutical composition comprising an effective amount for cancer treatment of at least one selected from the polynucleotides of claim 9.
47. A pharmaceutical composition comprising an effective amount for cancer treatment at least one selected from of the polynucleotides of claim 10.
48. A pharmaceutical composition comprising an effective amount for cancer treatment of at least one selected from the polynucleotides of claim 11.
- 10 49. A pharmaceutical composition comprising an effective amount for cancer treatment of at least one selected from the polynucleotides of claim 12.
50. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the recombinant vectors of claim 13.
- 15 51. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the recombinant vectors of claim 14.
52. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the recombinant vectors of claim 15.
- 20 53. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the recombinant vectors of claim 16.

54. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the transformants of claim 17.

55. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the transformants of claim 18.

56. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the transformants of claim 19.

10 57. A pharmaceutical composition comprising, an effective amount for cancer treatment of at least one selected from the transformants of claim 20.

58. A method for treating cancer comprising applying to a patient the inducer of cytotoxic T lymphocytes of claim 3.

15 59. A method for treating cancer comprising applying to a patient the inducer of cytotoxic T lymphocytes of claim 4.

60. A method for treating cancer comprising applying to a patient the cancer vaccine
20 of claim 7.

61. A method for treating cancer comprising applying to a patient the cancer vaccine
of claim 8.

62. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 44.

63. A method for treating cancer comprising applying to a patient the pharmaceutical
5 composition of claim 45.

64. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 46.

10 65. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 47.

66. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 48.

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67. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 49.

68. A method for treating cancer comprising applying to a patient the pharmaceutical
20 composition of claim 50.

69. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 51.

70. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 52.

71. A method for treating cancer comprising applying to a patient the pharmaceutical
5 composition of claim 53.

72. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 54.

10 73. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 55.

74. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 56.

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75. A method for treating cancer comprising applying to a patient the pharmaceutical composition of claim 57.

76. The method of claim 58, wherein lymphocytes of said patient are treated with
20 said inducer in vivo.

77. The method of claim 58, wherein lymphocytes of said patient are treated with
said inducer in vitro.

78. The method of claim 59, wherein lymphocytes of said patient are treated with said inducer in vivo.

79. The method of claim 59, wherein lymphocytes of said patient are treated with
5 said inducer in vitro.

80. The method of claim 60, wherein lymphocytes of said patient are treated with said cancer vaccine in vivo.

10 81. The method of claim 60, wherein lymphocytes of said patient are treated with said cancer vaccine in vitro.

82. The method of claim 61, wherein lymphocytes of said patient are treated with said cancer vaccine in vivo.

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83. The method of claim 61, wherein lymphocytes of said patient are treated with said cancer vaccine in vitro.

84. The method of claim 62, wherein lymphocytes of said patient are treated with
20 said pharmaceutical composition in vivo.

85. The method of claim 62, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vitro.

86. The method of claim 63, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.
87. The method of claim 63, wherein lymphocytes of said patient are treated with
5 said pharmaceutical composition in vitro.
88. The method of claim 64, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.
- 10 89. The method of claim 64, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vitro.
90. The method of claim 65, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.
- 15 91. The method of claim 65, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vitro.
92. The method of claim 66, wherein lymphocytes of said patient are treated with
20 said pharmaceutical composition in vivo.
93. The method of claim 66, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vitro.

94. The method of claim 67, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vivo.

95. The method of claim 67, wherein lymphocytes of said patient are treated with
5 said pharmaceutical composition in vitro.

96. The method of claim 68, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vivo.

10 97. The method of claim 68, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vitro.

98. The method of claim 69, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vivo.

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99. The method of claim 69, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vitro.

100. The method of claim 70, wherein lymphocytes of said patient are treated with
20 said pharmaceutical composition in vivo.

101. The method of claim 70, wherein lymphocytes of said patient are treated with said pharmaceutical composition in vitro.

102. The method of claim 71, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.
103. The method of claim 71, wherein lymphocytes of said patient are treated with
5 said pharmaceutical composition in vitro.
104. The method of claim 72, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.
- 10 105. The method of claim 72, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vitro.
106. The method of claim 73, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.
- 15 107. The method of claim 73, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vitro.
108. The method of claim 74, wherein lymphocytes of said patient are treated with
20 said pharmaceutical composition in vivo.
109. The method of claim 74, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vitro.

110. The method of claim 75, wherein lymphocytes of said patient are treated with
said pharmaceutical composition in vivo.

111. The method of claim 75, wherein lymphocytes of said patient are treated with
5 said pharmaceutical composition in vitro.

112. A reagent kit for use in the method for screening a compound that interacts with
the peptide of claim 1 and enhances the recognition property by at least one of
10 HLA-A2402-restricted cytotoxic T lymphocytes or HLA-A2-restricted cytotoxic T
lymphocytes, wherein said reagent kit includes at least one or more peptide(s) according to
claim 1.

113. A reagent kit for use in the method for screening a compound that interacts with
the peptide of claim 1 and enhances the recognition property by at least one of
15 HLA-A2402-restricted cytotoxic T lymphocytes or HLA-A2-restricted cytotoxic T
lymphocytes, wherein said reagent kit includes at least one or more polynucleotide(s)
which encodes the peptide according to claim 1.

114. A reagent kit for use in the method for screening a compound that interacts with
20 the peptide of claim 1 and enhances the recognition property by at least one of
HLA-A2402-restricted cytotoxic T lymphocytes or HLA-A2-restricted cytotoxic T
lymphocytes, wherein said reagent kit includes at least one or more recombinant vector(s)
comprising the polynucleotide which encodes the peptide according to claim 1.

115. A reagent kit for use in the method for screening a compound that interacts with
the peptide of claim 1 and enhances the recognition property by at least one of
HLA-A2402-restricted cytotoxic T lymphocytes or HLA-A2-restricted cytotoxic T
lymphocytes, wherein said reagent kit includes at least one or more transformant(s)
5 transformed with the recombinant vector comprising polynucleotide which encodes the
peptide according to claim 1.

116. A reagent kit for use in the method for screening a compound that interacts with
the peptide of claim 1 and enhances the recognition property by at least one of
10 HLA-A2402-restricted cytotoxic T lymphocytes or HLA-A2-restricted cytotoxic T
lymphocytes, wherein said reagent kit includes at least one or more antibody(s) that
immunologically recognizes the peptide according to claim 1.

117. A reagent kit for use in the method for screening a compound that interacts with
15 the peptide of claim 2 and enhances the recognition property by HLA-A2402-restricted
cytotoxic T lymphocytes, wherein said reagent kit includes at least one or more peptide(s)
according to claim 2.

118. A reagent kit for use in the method for screening a compound that interacts with
20 the peptide of claim 2 and enhances the recognition property by HLA-A2402-restricted
cytotoxic T lymphocytes, wherein said reagent kit includes at least one or more
polynucleotide(s) which encodes the peptide according to claim 2.

119. A reagent kit for use in the method for screening a compound that interacts with
25 the peptide of claim 2 and enhances the recognition property by HLA-A2402-restricted

cytotoxic T lymphocytes, wherein said reagent kit includes at least one or more recombinant vector(s) comprising the polynucleotide which encodes the peptide according to claim 2.

5 120. A reagent kit for use in the method for screening a compound that interacts with the peptide of claim 2 and enhances the recognition property by HLA-A2402-restricted cytotoxic T lymphocytes, wherein said reagent kit includes at least one or more transformant(s) transformed with the recombinant vector comprising the polynucleotide which encodes the peptide according to claim 2.

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121. A reagent kit for use in the method for screening a compound that interacts with the peptide of claim 2 and enhances the recognition property by HLA-A2402-restricted cytotoxic T lymphocytes, wherein said reagent kit includes at least one or more antibody(s) that immunologically recognizes the peptide according to claim 2.

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122. A reagent kit for use in the method for screening a compound that interacts with the polynucleotide which encodes the peptide according to claim 1 and enhances the expression of said peptide, wherein said reagent kit includes at least one or more polynucleotide(s) which encodes the peptide according to claim 1.

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123. A reagent kit for use in the method for screening a compound that interacts with the polynucleotide which encodes the peptide according to claim 2 and enhances the expression of said peptide, wherein said reagent kit includes at least one or more polynucleotide(s) which encodes the peptide according to claim 2.

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